

REMARKS

Claims 1-47 are pending in the Office Action. Claims 1-27 and 29-44 have been amended. Claim 48 has been added. Claims 28 and 45-47 have been cancelled. No new matter has been added. The rejections of the claims are respectfully traversed in light of the following amendments and remarks and reconsideration is requested.

Rejections Under 35 U.S.C. § 112

Claim 27 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The Examiner writes in part that "Claim 27, line 7, the period ---at the end should be changed to --;--."

Claim 27 has been amended to replace the noted period with a semicolon.

Rejections Under 35 U.S.C. § 102

Claims 27-30 are rejected under 35 U.S.C. § 102(b) as being anticipated by Liu et al. (U.S. Patent No. 6,277,330 hereinafter "Liu"). In rejecting the claims, the Examiner writes in part that "Liu et al teaches that the TIR sensor can be used as a substrate on which a first grating and/or a second grating may be formed (column 5 lines 51-56 and figures 8A-8E)."

Liu discloses that "the concentration of the chemical substance in water may be measured as a function of the intensity of reflected light at a fixed detection angle." (Liu, col.4, ll.4-6). Liu further discloses that using "the waveguide mode method, the concentration of the chemical substance is measured as a function of the reflectivity of the polymer thin film or an angular position of a waveguide mode." (Liu, col.5, ll.7-10). Thus, Liu discloses the measurement of a concentration of chemical substances.

Claim 27 has been amended to recite in part "providing an evanescent field, such that, when a specimen array is placed within the evanescent field, spatially distributed polarization changes in the cross-section of the light beam result" and "a two-dimensional array detector, said detector resolving the light beam to provide an image based on the spatially distributed polarization changes."

Liu does not disclose or suggest measurement of change in optical properties at any particular location on the polymer film since the detection of a change in concentration of the chemical substance is not related to "spatially distributed polarization changes" as claimed in Claim 27. Therefore, because Liu does not disclose or suggest all the limitations of Claim 27, Claim 27 is patentable over Liu.

Claim 28 has been cancelled.

Claims 29-30 are dependent on Claim 27 and contain additional limitations that further distinguish them from Liu. Therefore, Claims 29-30 are allowable over Liu for at least the same reasons provided above with respect to Claim 27.

In view of the foregoing, Applicants respectfully request that the rejections under 35 U.S.C. § 102(b) be withdrawn.

Rejections Under 35 U.S.C. § 103

Claims 1-19, 27, and 29-47 are rejected under § 103(a) as being unpatentable over Ivarsson (U.S. Patent No. 6,493,097) in view of Liu.

Applicants submit that Ivarsson does not disclose an apparatus that can image spatially in a two-dimensional area. Instead, Ivarsson discloses scanning over a range of incident angles or wavelengths. Ivarsson discloses "sequentially or continuously scanning the incident angle of the light over an angular range, sequentially or continuously scanning the wavelength of the light over a wavelength range, or both." (Ivarsson, col.25, ll.19-22). Ivarsson further discloses "means for sequentially or continuously scanning said light incident at said sensor surface over a range of incident angles and/or wavelengths." (Ivarsson, col.26, ll.45-47). Ivarsson does not remedy the deficiencies of Liu noted above.

As correctly noted by the Examiner, "Ivarsson and Liu et al do not explicitly teach that the detector detects beam of light reflected from the TIR surface including the spatially distributed polarization change caused by the specimen." (Office Action, page 5).

Claim 1 has been amended to recite in part "the optical assembly accommodates positioning a specimen array within the evanescent field, such that the specimen array causes spatially distributed polarization changes in the cross-section of the light beam" and "a two-dimensional array detector positioned to detect the spatially distributed polarization changes in the light beam to provide an image of the specimen array." Therefore, because Ivarsson and Liu, alone or in combination, do not disclose or suggest all the limitations of Claim 1, Claim 1 is patentable over Ivarsson in view of Liu.

Similarly, Claim 27 has been amended to recite in part "providing an evanescent field, such that, when a specimen array is placed within the evanescent field, spatially distributed polarization changes in the cross-section of the light beam result" and "a two-dimensional array detector, said detector resolving the light beam to provide an image based on the spatially distributed polarization changes." Therefore, because Ivarsson and Liu, alone or in combination, do not disclose or suggest all the limitations of Claim 27, Claim 27 is patentable over Ivarsson in view of Liu.

Similarly, Claim 32 has been amended to recite in part "when a specimen array is placed within the evanescent field, spatially distributed polarization changes in the cross-section of the light beam result" and "a two-dimensional array detector, said detector resolving the light beam to provide an image based on the spatially distributed polarization changes." Therefore, because Ivarsson and Liu, alone or in combination, do not disclose or suggest all the limitations of Claim 32, Claim 32 is patentable over Ivarsson in view of Liu.

Claims 2-13 are dependent on Claim 1 and contain additional limitations that further distinguish them from Ivarsson in view of Liu. Therefore, Claims 2-19 are allowable over Ivarsson in view of Liu for at least the same reasons provided above with respect to Claim 1.

Claims 29-31 are dependent on Claim 27 and contain additional limitations that further distinguish them from Ivarsson in view of Liu. Therefore, Claims 29-31 are allowable over Ivarsson in view of Liu for at least the same reasons provided above with respect to Claim 27.

Claims 33-44 are dependent on Claim 32 and contain additional limitations that further distinguish them from Ivarsson in view of Liu. Therefore, Claims 33-44 are allowable over Ivarsson in view of Liu for at least the same reasons provided above with respect to Claim 32.

Claims 28 and 45-47 have been cancelled.

In rejecting Claim 14, the Examiner writes in part that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in Liu et al a frame for coupling the optical element having a locating portion engageable with a mating locating element of the TIR instrument because this is a known technique which is known to serve for the purpose of Liu et al."

Applicants request the Examiner to provide support for his conclusions. The Examiner has not provided any support for a "known technique" and has not explained how a cassette usable in Liu would be constructed nor any suggestion or motivation for doing so.

Applicants submit that Liu does not disclose or suggest a "cassette for use with an imaging apparatus, said imaging apparatus including . . . a two-dimensional array detector adapted for providing an image based on spatially distributed polarization changes in the light beam," as recited in Claim 14.

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Claims 15-19 are dependent on Claim 14 and contain additional limitations that further distinguish them from Ivarsson in view of Liu. Therefore, Claims 15-19 are allowable over Ivarsson in view of Liu for at least the same reasons provided above with respect to Claim 14.

Claims 20-26 and 28 are rejected under § 103(a) as being unpatentable over Ivarsson and Liu as applied to Claims 1-19, 29, 29-47 above, and further in view of Butzer (U.S. Patent No. 5,483,346).

These rejections are respectfully traversed. The present invention as defined in Claims 20-26 comprehends a major breakthrough in the art. The information in the light beam when processed creates an image of the spatially distributed polarization changes in the beam allowing for rapid and highly resolution imaging.

In rejecting the claims, the Examiner writes in part:

Both Ivarsson and Liu et al do not explicitly teach that the detector detects beam of light reflected from the TIR surface including the spatially distributed polarization change caused by the specimen. However, such a feature is known in the art as taught by Butzer. Butzer teaches that the presence of the substance is determined on the basis of chang[e] in polarization.
(Office Action, page 5)(emphasis added)

Applicants submit that Butzer only discloses the following:

The presence or composition of a substance or substances on the transparent material's surface causes a shift in the polarization of the light at the internal reflections. This results in a change in the polarization of the light striking the polarized-light detector"
(Butzer, col.2, ll.54-59).

The strength of the light reaching polarized-light detector 20 could be used to directly note how many of the total internal reflections occur at boundaries with surrounding medium 14 and how many occur at boundaries with substance to be analyzed or detected 26. This could be accomplished by a table look-up of all possible values.
(Butzer, col.8, ll.15-20).

An alternate approach . . . is useful when detecting a change in the presence of a substance. With this approach, the output of polarized-light detector 20 is monitored for changes.
(Butzer, col.8, ll.20-23).

Butzer only discloses detection of a polarization change from an output signal one signal at a time. Butzer does not otherwise disclose or suggest "a polarization-sensitive imaging detector, said detector detecting the light beam reflected from the reflective surface including the spatially distributed polarization changes caused by the specimen array," as recited in Claim 20. Applicants submit that Butzer does not remedy the deficiencies of Ivarsson and Liu noted above nor make the invention obvious. Therefore, because Ivarsson and Liu in view of Butzer, alone or in combination, do not disclose or suggest all the limitations of Claim 20, Claim 20 is patentable over Ivarsson and Liu in view of Butzer.

Claims 21-26 are dependent on Claim 20 and contain additional limitations that further distinguish them from Ivarsson and Liu in view of Butzer. Therefore, Claims 21-26 are allowable over Ivarsson and Liu in view of Butzer for at least the same reasons provided above with respect to Claim 20.

Claim 28 has been cancelled.

In view of the foregoing, Applicants respectfully submit that all rejections have been resolved and request that the rejections under 35 U.S.C. § 103(a) be withdrawn.

New Claim

Claim 48 has been added. Claim 48 is dependent on Claim 1 and contains additional limitations that further distinguish it from Ivarsson, Liu, and Butzer, alone or in combination. Therefore, Claim 48 is allowable over Ivarsson, Liu, and Butzer for at least the same reasons provided above with respect to Claim 1.

CONCLUSION

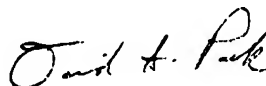
For the above reasons, Applicants believe pending Claims 1-27, 29-44, and 48 are now in condition for allowance and allowance of the Application is hereby solicited. If the Examiner has any questions or concerns, the Examiner is hereby requested to telephone Applicants' Attorney at (949) 752-7040.

I hereby certify that this correspondence is being transmitted via facsimile to telephone number (703) 308-7382 addressed to: Mail Stop Amendment, Group Art Unit 2877, Commissioner for Patents, Washington, D.C. 20231, on August 1, 2003.


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Respectfully submitted,



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